Department of
Information Engineering
and Computer Science
DISI

UNIVERSITY
OF TRENTO - Italy

DISI - Via Sommarive 5 - 38123 Povo - Trento (Italy)
http://disi.unitn.it

SERVICE INNOVATION: THE CHALLENGE OF MANAGEMENT IN HYPERCOMPETITIVE MARKETS

Sandro Battisti
Politecnico di Milano
Department of Management, Economics and Industrial Engineering
Piazza Leonardo da Vinci, 32, 20133, Milan, Italy
E-mail: sandro.battisti@mail.polimi.it

March 2012

Technical Report # DISI-13-017
Version x.y

Published also: *International Journal of Technology Marketing*

Abstract: Service innovation based on high technology is one of the most challenging subjects in management research, and hypercompetitive markets seem to be the right empirical field for theory building. The development of new services and the organizational networks could be designed by enabling service diffusion in hypercompetitive markets. The emerging research question is: how do companies integrate concepts of organizational networks, of technology diffusion and of competitive advantage for developing and managing service innovation in hypercompetitive markets? The proposed methodology combines a case study research and a clinical inquiry research. The main finding is the presentation of a model for service innovation management in hypercompetitive markets. It suggests that companies must be able to develop flexible routines to adapt their processes in order to design services for hypercompetitive markets. Companies that organise structures enabling to overcome constrains for technology diffusion could increase the innovation success rate within these markets.

Keywords: Service innovation; collaborative innovation; new service development; organizational networks; technology diffusion; competitive advantage; environmental turbulence; vehicle security; emerging markets; hypercompetitive markets.

Reference to this paper should be made as follows: Battisti (2012) 'Service Innovation: The Challenge for Management in Hypercompetitive Markets', *Int. J. Technology Marketing*, Vol. 7, No. 2, pp. 99–118.

Biographical notes: Sandro Battisti is a PhD Candidate in Management, Economics and Industrial Engineering at Politecnico di Milano. His thesis is related to innovation management and new service development based on information and communication technologies. His research interests are centred on technology and innovation management, with a particular focus on innovation strategy; service innovation; open innovation; technology diffusion and entrepreneurship. He holds an MBA from the IBGEN and a Bachelors degree in Electronic Engineering from the PUCRS, both in Brazil. He has ten years of experience in management of telecommunication services in Brazil.

1 Introduction

Service innovation management in hypercompetitive markets is a new challenge for both academia and practitioners. Hoskisson et al., (2000) argue that analysing emerging markets using resource-based theory could be a central question and states that little research has been carried out in this direction. Supporting the understanding of emerging markets, Arnold and Quelch (1998) suggest that an emerging economy exists where there is rapid economic development and government policies that enable adoption of a free-market system. A recent study about hypercompetitive markets in Latin America carried out by Hermelo and Vassolo (2010) found a lack of specific literature on the hypercompetition phenomenon. They argue that competitive advantage is becoming less sustainable in emerging markets and suggest that firms could design resource-based strategies. From this perspective, the present research suggests that emerging markets could be considered as hypercompetitive environments.

In hypercompetitive markets the competitive advantage of companies through user involvement in the process of new service development is imperative to obtain innovation acceptance by the market. From the literature of technology management, one important factor for competitive advantage is to have the innovation as dominant design in the target market. The adoption of a technological dominant design by the market is a growing challenge to be managed by the companies that compete under market conditions of fast-changing, as argue Christensen et al., (1998). In the same way, the reconfiguration of companies' dynamic capabilities in real-time is also important for competitive advantage. In this sense, companies with a strategy based on construction of strong dynamic capabilities are intensely entrepreneurial and they shape the business ecosystem through innovation management, as argues Teece (2007). Additionally, Tushman et al., (2010) argue that these capabilities are results from actions of senior managers to improve the learning capacity of companies, aiming at the reconfiguration and transformation of their internal process in face of new markets. Greve (2009) suggests that investigation of the speed and selectivity of innovation diffusion will be a valuable addition to the field of strategy, and Gulati et al., (2000) argue that using a network of companies to manage resources is also important and could be considered a unique structural pattern to competitive advantage.

Exploring the service innovation literature, Miles (2000) argues about the need for

better understanding the interaction between actors in the process of service innovation. Tidd and Hull (2003) argue about the importance of research of new structures for service innovation and successful performance in a market. In the same way, the success of high technology innovations could be analysed in a decision-making perspective where the configuration of a network structure seems to be crucial for hypercompetition, as present van Riel et al., (2004). Additionally, service innovation in hypercompetitive markets could be developed through organizational network of companies, especially in high-tech markets, as suggests Battisti (2009).

Recent studies focused on new service development (e.g., MacCormack and Verganti, 2003; Calantone et al., 2003; Verganti and Buganza, 2005; Buganza et al., 2009) suggest that environmental turbulence of certain markets could force companies to develop processes and organize resources in order to obtain flexibility. Additionally, Dolfsma (2004) states that the innovation process in the service companies is little studied, especially regarding the benefits of the formalisation of new service development processes. Ettlie and Rosenthal (2011) argue that little research has appeared in this field, and support the importance of using customers as a source for successful new ideas. In this sense, Schleimer and Shulman (2011) suggest that little is known about how networks of companies are structured and how to make them collaborate in the development of new services in a more volatile environment.

From the current understanding of service innovation management, the research question is: how do companies integrate concepts of organizational networks, of technology diffusion and of competitive advantage for developing and managing service innovation in hypercompetitive markets? The paper is organized in 5 sections as follows: The section 2 explores the phenomenon of hypercompetitive markets and develops the theoretical framework; the section 3 describes the methodology for the empirical investigation; the section 4 presents the data analysis and empirical evidences; the section 5 presents the results and the model for management service innovation in hypercompetitive markets and finally the section 6 presents the discussions and conclusions.

2 Theoretical Framework

For understanding the phenomenon of hypercompetitive markets, D'Aveni (1994) and Volberda (1996) suggest that successful companies must organise strategies for introduce continuous environmental changes and at the same time develop strategies to learn from

the continuous changes provided by other competitors. From this perspective, hypercompetitive markets could be considered as environments that force companies to move more quickly than competitors. These markets could also force strategy changes in terms of organizational structure for keeping the competitive advantage. The hypercompetition phenomena is reshaping the competitive landscape worldwide, as suggest Ilinitch et al., (1996), especially in emerging markets with highly uncertain environments and global players.

The equilibrium of hypercompetitive environments depends on continuous changes and is directly related to the unpredictable behaviour of certain players, as argues Anderson (1999). In this sense, companies that are faster than competitors in decision-making and in learning from environmental changes could obtain higher competitive advantage. In hypercompetitive markets innovations could be unforeseen to consumers, and generally managers must anticipate demands before clients need them, as suggest Bogner and Barr (2000). In this sense, the integration of the literature on organizational networks, on technology diffusion and on organizational strategy, could be a right way to analyse the presented phenomenon. This multidisciplinary perspective is presented as following and aims at developing a model of support in understanding of the management of the challenges of service innovation in hypercompetitive markets.

2.1 Organizational networks and technology innovation

The new service development based on high-technology innovations is passing from an individual to a collective process, especially where hypercompetition circumstances force companies to create partnerships networks for innovation management. In this context, Dodgson et al., (2008) argue that innovations in networks are a useful way to arrange companies in order to manage technology based on the complexity to integrate this technology in the network. As suggests Rothwell (1992) and Lavie (2007), the focus is carried through networks of companies based on several different forms of alliances, constructing relationship with customers, suppliers, and many other partners. Brass et al., (2004) suggest that actors are embedded within networks to obtain opportunities and overcome constrains, considering that actors are nodes formed by organizations and ties represents the relationship between the nodes. In this sense, Gulati (1999) argues that network resources accessed by each company could be directly related to their company performance.

Collaborative networks allow companies to develop, to keep and to manage service innovation, as argue Pisano and Verganti (2008). In this sense, Rothwell (1992) and Dodgson et al., (2002) describes innovation as a process of accumulation of know-how through learning from inside and outside of the company using innovative ways. Considering that networks must learn to improve their structures, Zaheer and Bell (2005) argue that if networks are better positioned to exploit internal resources then managers could focus their attention on building companies' internal capabilities for competitive advantage. Chiaroni et al., (2008) argue that a critical factor in the service innovation success is the effective exchange of knowledge between organizations, especially in technical and scientific services companies. In this sense, top managers must have the ability to structure their networks to identify and exploit new knowledge.

In the context of hypercompetitive environments, the creation of a virtuous circle of integrated networks enables higher rate of innovation's success. In this sense, Gulati et al., (2000), Brass et al., (2004) and Smart et al., (2007) argue that the organizational networks configuration could be used to access learning and know-how to improve the innovation's capacity and performance. Considering that changes are based on constant discontinuity of technologies, Tidd et al., (2005) suggest that complex and uncertain environments affect the innovation's management and performance. In this complex interaction with the environment, von Hippel (2007) and Bilgram et al., (2008) suggests that users must be part of the network for enabling companies of understand the real needs, and suggests that a horizontal innovation network of users could be a tool for perception of the direct benefits from innovations. In the same way, Goduscheit (2009) argues about the importance of involving customers in the organizational network. Additionally, Chiesa et al., (2004) argue that a critical point is to maintain and sustain an external network of competences, because this network must be interconnected with their customers.

In order to develop a better competitive performance, networks must have a company leader acting as a kind of catalyst hub of knowledge and coordination. In this sense, Dhanaraj and Parhe (2006) and Karttinen et al., (2008) argue about the important role of hub companies and also multi-hub intermediate companies for the network success. This kind of companies is crucial in enable competitive advantage, because posses high ability of pulling together the dispersed resources of the network members to enhance the innovation success. They also suggest that the entrepreneurial approach of the hub firm into the network is very important for competitive advantage. In the same way, Lavie (2007) argues that dominant partners can facilitate joint value creation while an excessive

appropriation of that value could affect each firm's individual performance, and Gulati et al., (2009) argue that competitive advantage derives from identifying the contingent role of partnering experience.

Based on the previous literature that describes an overview about 'Networks', a set of attributes is suggested to the empirical analysis, as presented in table 1.

Table 1 Network attributes

Attributes	*The suggested description*	*Main references*
1. Collaborative innovation	Companies are organised in networks for obtaining opportunities and overcome constrains	Brass et al., (2004), Lavie (2007)
2. Learning from users	Users participate as part of the network to help companies to enhance service innovation	Gulati et al., (2000), von Hippel (2007)
3. Learning from managers	Managers enhance ability to exploit and explore new knowledge in the network of companies	Rothwell (1992), Zaheer and Bell (2005)
4. Structure design	Networks are designed for enabling access to external know-how for innovation management	Pisano and Verganti(2008), Chiesa et al., (2004)
5. Structure coordination	The most influential company of the network must be the hub to manage the innovation process	Dhanaraj and Parhe (2006), Lavie (2007)

2.2 Technological diffusion and early adoption

The diffusion of innovative services based on high-technology in hypercompetitive environments could be considered as an important field of study. In this sense, Geroski (2000) argues about the importance and the vast literature on technology diffusion. The development of diffusion of service innovation in these markets is not explored. From this perspective, Tidd (2010) presents that companies could obtain success in the technology diffusion if their innovations are translated into social and economic benefits in a certain social system.

The innovation success depends on the understanding of the service innovation by the market, as argues Tidd (2010). In the same way, Zahra and Nielsen (2002) suggest that the internal and external resources of company significantly influence the technology's commercialization. In this sense, Rogers (2003) suggests that diffusion is the process where an innovation is communicated through certain channels, in a specific time between members of a society. Diffusion is a special type of communication where messages are

related to new ideas and concepts. In this sense, Gibbons (2004) suggests that local aspects of networks design impact on the speed of its diffusion. Greve (2009) argues that uncertainty about the value of innovation is an important reason for its selective diffusion. He also suggests that firms can obtain competitive advantage by being early adopters of the innovation inside the network. Also important for determination of market success is the integration of early adopters inside the network, as argue Chiesa and Frattini (2011) in their recent study about technology innovations.

In the process of organizing resources for technological diffusion is imperative for companies the understanding of the particularities of hypercompetitive markets. From this perspective, Verganti (2008) suggests that companies could develop deeper understanding of user needs applying the concepts of design thinking, an approach defined as design-driven innovation. This approach enable companies to interpret the context of the social systems, and in this sense the companies can anticipate radical changes in meanings of the service innovation that will be commercialized in hypercompetitive markets. Additionally, Verganti (2011), states that companies that use design thinking are more propensity to have their innovation diffusion in the market. It is occurring because the high levels of intuitiveness provided by the costumers through the exploration and sharing the innovation in an interconnected way. In this sense, Chakravorti (2004) argues that managers need to develop new alternative ways to diffuse innovations into the markets, especially through the understanding of the nature of market resistance for new ideas. It mainly could occur when competitors are closely interconnected with users, as suggested by Attewell (1992).

For developing structures to be interconnected with users Rogers (2003) argues about the importance of understanding the nature of the communication channel. He argues that these channels are process where actors create and share information to reach a reciprocal agreement and is a way in which new ideas are passed from person to person aim to achieve high rates of diffusion. Rogers (2003) also states that communication channels can be massive or interpersonal. The former is more effective in spreading the general idea in the market and the latter is more effective in the decision of market adoption. Chanda and Bardhan (2008) argue that companies could develop decision-making processes based on competitive marketing variables. These variables could help on the prediction of the new service adoption process, especially in technology industries, as suggest Norton and Bass (1987). Regarding to the adoption of service innovation, Ratten (2009) argues that companies could take into account the frequency of the environmental changes because it could affect the intention of costumers for innovation's acquisition.

Based on the previous literature that describes an overview about 'Diffusion', a set of attributes is suggested to the empirical analysis, as presented in table 2.

Table 2 Diffusion attributes

Attributes	*The suggested description*	*Main references*
1. Market understanding	The user's perception about the innovation as the best solution for solving problems	Rogers (2003), Verganti (2008)
2. Market compatibility	The user's perception about the consistency between the companies' proposal and real needs	Zahra and Nielsen (2002), Greve (2009)
3. Market interconnection	The results of the innovation are visible, intuitive and interconnected in technology markets	Chakravorti (2004), Verganti (2011)
4. Innovation complexity	The user's perception about the difficulty of understanding and use the innovation	Rogers (2003), Tidd (2010)
5. Innovation trialability	The innovation may be experimented in a limited basis enabling early adoption	Rogers (2003), Chiesa and Frattini (2011)

2.3 Organizational strategy and competitive advantage

The development of strategies for innovation management under highly uncertain and rapidly changing environment has an important role, in acting as the key element for emerging perspectives (Bessant et al., 2005). In this sense, the ability to recognize external information, and actualize new products based on the specific clients' needs is presented by Cohen and Levinthal (1990) as absorptive capacity, and by Zahra and George (2002) that this capacity could be divided in two types, where potential capacity comprises knowledge acquisition and assimilation capabilities, and realized capacity centres on knowledge transformation and exploitation. In this sense, companies have to develop core skills to guarantee a positive path-dependency for competitive advantage. As Barney (2001) suggests, resource-based theories can be used to evaluate the competitive potential for the companies' strategy.

Strategic decision making is associated with extensive use of real-time information, as argues Eisenhardt (1989b), where top managers seeking to review information to develop the right routines to respond rapidly in front of pressing situations. The main factor of competitive advantage, as suggest Teece et al., (1997), is 'dynamic capabilities': the capacity to renew competences when time-to-market is critical and the role of strategic

management and configuring internal and external resources. In this sense, Zhang (2009) argues that absorptive capacity is a dynamic capability for obtaining benefits of learning and generating market intelligence. Taking into consideration a strategic marketing positioning, Winter (2003) argues that strategic innovation is not a particular and repetitious routine, but is a real-time response to novel challenges from the environment. In this sense, Eisenhardt and Martin (2000) suggest that the dynamic capabilities represent a set of specific and identifiable processes such as product development, strategic decision making and alliances. They also argue that in high-velocity markets capabilities are considered as consistent simple rules for real-time knowledge creation.

Based on the managers' perspective, Tushman et al., (2010) suggest that dynamic capability is the ability of a company to reconfigure assets and existing capabilities. Additionally, Brown and Eisenhardt (1997) argue that continuously changing organizations are likely to be complex adaptive systems with semi structures based on sequenced steps, aiming to grow over time. In this sense, Boer and Gertsen (2003) argue that continuous innovation is the ability to combine operational effectiveness and strategic flexibility. Tushman et al., (2010) argue that the ability of senior managers to seize opportunities through the orchestration of assets to overcome inertia and path dependencies is the core of dynamic capabilities.

For successful innovation strategy, Brown and Eisenhardt (1997) argue that managers can improvise current projects by combining responsibilities with communication and freedom. In this way, Teece (2007) suggests that entrepreneurial managers are responsible for maintaining dynamic capabilities, through sensing and transformation of them for competitive advantage. Additionally, Smith and Tushman (2005) argue that the performance of the organization depends on top management teams effectively exploring and exploiting. Zollo and Winter (2002) argue that dynamic capabilities are shaped by learning mechanisms of knowledge codification as systematic patterns of organizational activity for generation and adaptation of operating routines.

From the emerging markets context, Ethiraj et al., (2005) suggest that dynamic capabilities are a useful way to understand performance differentials between companies and suggest that capabilities are context-specific and it is necessary to conceptualize and study them accordingly. Ambrosini and Brown (2009) argue that dynamic capabilities are processes that impacts upon resources and evolved through time as a quite stable phenomenon that includes co-ordination and integration, learning and reconfiguration.

Based on the previous literature that describes an overview about 'Strategy', a set of

attributes is suggested to the empirical analysis, as presented in table 3.

Table 3 Strategy attributes

Attributes	*The suggested description*	*Main references*
1. Absorptive capacity	Companies' ability to update service innovation based on the user-needs	Cohen and Levinthal (1990), Zahra and George (2002)
2. Decision making	Manager's ability to develop routines for respond rapidly in pressing situations	Smith and Tushman (2005), Eisenhardt and Martin (2000)
3. Resource recombination	Companies' ability to develop processes to recombine dynamic capabilities	Teece et al., (1997), Tushman et al., (2010)
4. Competitive advantage	Managers' ability to act for sensing and transforming of dynamic capabilities	Brown and Eisenhardt (1997), Teece (2007)
5. Context specificity	Companies' ability to recognize, to act and to learn in hypercompetitive markets	Zollo and Winter (2002), Ethiraj et al., (2005)

3 Methodology

This research is exploratory and based on the empirical field of vehicle security services in Brazil. In this context, the eight main competitors were analysed through secondary data. The Uniconn Group (now defined 'The Network') is the unity of analysis for the in-depth study. The proposed research methodology combines a case study research from sep-2005 to feb-2007 and a clinical inquiry research from feb-2007 to feb-2009, as presented in table 4. This methodology could be the most appropriate when aiming at theory building and achievement of necessities of both academics and managers alike.

Table 4 Set of research activities

Research activities	*Timeline*
1. Preliminary market analysis: understanding the innovation	sep/05-oct/05
2. Deep market analysis: understanding competitors	oct/05-apr/06
3. Secondary data-collection: Preparing questions for interviews	may/06-aug/06
4. Interviews: six in-depth interviews of around two hours each	sep/06-feb/07
5. Company needs: Asking help for massive innovation diffusion	feb/07-mar/07
6. Acting by intervening on meetings to problem solving	mar/07-dec/07
7. Acting by analyzing companies' performance in the market	dec/07-jan/08
8. Acting in real-time because of hypercompetitive market changes	jan/08-feb/08
9. Acting in the companies' problem solving and methodology fit	feb/08-feb/09

At the "case study research" stage: Building a theory from case study research is iterative, where the process itself involves constant iteration backward and forward between steps, as argues Eisenhardt (1989a). Flyvbjerg (2006) argues that good social science is problem driven and not methodology driven, in the sense that it employs those methods for a given problem, which best helps to answer the research question. He also suggests that case study is a necessary and sufficient method for certain important research tasks. From Yin (2009) and Eisenhardt and Graebner (2007), a single case study can enable the creation of emerging theories, because in single cases the researcher can apply their theory exactly to the particular case and as whole inductive research is a good tool to develop, measure, and create propositions. In this sense, the main reasons to choose this empirical field were the innovativeness and the high-velocity environment changes. The researcher went to the empirical field to obtain the multiple evidences from 'The Network'. The analysis of the main documents (technical manuals, websites and yearbooks) and the portfolio of products of the three companies were carried out. Direct field observations were carried out visiting mainly the sectors of R&D, production and marketing. In-depth interviews with the six top managers (two directors of each company of the Uniconn Group) were carried out.

At the "clinical inquiry research" stage: 'The Network' has needs to solve problems and ask for a clinical inquiry research. This model makes the research start with the needs of the client, where the client drives and involves the researcher in the client's issues rather

than involving the client in the researcher's issues. This dynamic nature of the relationship between actors frames the inquiry process through systematic data collection, as argue Shani et al., (2004). Schein (2008) suggests that a research approach to inquiry must be followed by principles that always stay in touch with the customers' reality. Stebbins and Shani (2009) argue that clinical inquiry research if conducted in a precise way could provide for the researcher a greater access to the organization and the possibility to generate theory. In this way the researcher acts as a process facilitator helping his customer in real-time actions such as observation, reaction, judgment and intervention in order to intervene and make a change in solving a specific organizational problem (Coghlan, 2009). In this context the researcher participated in the decision making meetings. The researcher conducted data gathering between these formal meetings that occurred weekly and the duration was 3-4 hours of discussion on how to improve the service innovation strategies for diffusion. The researcher presented the main questions at the beginning of the meeting and acted as a full participant in the discussion process, stimulating the data collection. The last twelve months of field work between researcher and 'The Network' was dedicated to solving problem and methodology fit through the analysis of the empirical evidence to theory building based on the theoretical framework.

As suggest Edmonson and McManus (2007), a nascent theory research could be fit based on a diversity of materials from empirical field to the development of insights and propositions for further research. In this sense, the combined methodology above could be the best way to understand this kind of study towards a clear research contribution for theory and practice.

4 Data analysis

The market of vehicle security services received a large quantity of new product for vehicle tracking with the arrival of cellular technologies in Brazil in 1995 (Battisti et al., 2008). At the last stage of the present research the market had eight main competitors that were focused on the development and commercialization of end-to-end solutions for vehicle security using high technology innovation. The competitors are classified taking into consideration the secondary data of the research study. Three levels of companies in terms of develop competitive service process (High, Medium and Low) are proposed according to the theoretical framework previous described in tables 1, 2 and 3. The main competitors in the Brazilian vehicle security are presented in table 5.

Table 5 Main competitors

Companies	*Networks Based*	*Diffusion Based*	*Strategy Based*
1. Chipsat	Medium	Medium	Medium
2. Protesat	Medium	Medium	Medium
3. Falconsat	Medium	Medium	Medium
4. Sascar	Medium	High	High
5. Carsystem	High	High	High
6. Lojack	High	High	High
7. Ituran	High	High	High
8. Uniconn Group	High	Low	High

The preliminary analysis shows that 'The Network' presents low levels of competitive processes in terms of 'diffusion attributes'. This is the main reason that the present research was focused to solving emerging problems of the companies. Is also important describe the formation of ‘The Network’ and the main features of the technological service solution developed by them.

The Network was officially established in early 2005 by 3 companies of small-medium size in the southern region of Brazil: Perto, Magaldi and Neoset. The Perto Company is located in the city of Gravataí-RS and is the second biggest company of bank automation in Brazil with 800 employees. It holds market share about 30% of the Brazilian market for bank automation and is controlled by a holding known as Group Digicon. The Magaldi Safety Group is located in the city of Porto Alegre-RS, specialized in safety solutions, sales of weapons and training of shooters. It holds a database with more than 24 thousand students and they is shooting club with more than 1500 active members. The Neoset Engineering Group is located in the city of Porto Alegre-RS, formed by an engineering team specialized in service innovation solutions based on mobile communications systems. It operates in the design of new service development process and in the business strategy for service innovation based on high-technology.

The main objective of ‘The Network’ was to present an innovative service solution based on mobile technology for vehicle security in the whole Brazilian territory. The main features of this service innovation are presented in table 6.

Table 6 Service innovation features

Features	*General description of the service innovation*
1. Technology	Communication through mobile networks. It permits easy access of the remote central station that is connected between companies and costumers. The localization of vehicles is supported by location based services (LBS) with the web portal and the mobility experience of users.
2. Simplicity	The service innovation does not need remote control by the users because the system is based on manual standards procedures. The security actions do not depend on the driver. The security solution is monitored by the remote central station.
3. Interactivity	The social interaction is based on the context observed in the hypercompetitive markets. The service innovation enable users easy access to information of the competent authorities in real-time about the robbery.
4. Accessibility	The technology offers the system automated and intelligent anti-robbery and anti-kidnapping, that enabling to send warnings to the relatives of the driver to inform about the position and the situation of them and the car.
5. Safety	The service innovation allows the management of robbery in real-time. The anti-robbery system blocks the vehicle immediately after the command of the remote central station.

The solution concept was thinking not only to protect a customer's car, but also to keep their personal security. Beyond addressing the social and economic needs of the population, the device also allowed users to have a new opportunity to save money, considering the high costs of private insurance in Brazil. Aiming to provide for the population's social and economic needs, 'The network' provides the highest innovative service standards. In order to better understand the relation between the three companies of 'The Network', a list of evidences from Neoset Company is presented in table 7.

Table 7 Neoset's evidences

Topic	*Empirical evidences*
1. Networks	1. Act as responsible for certifying the service innovation with the insurance companies
	2. Act as hub firm in the updating of customers database and feedback environment
	3. Act as hub firm in the process of client billing and rendering service responsibility
	4. Act as hub firm in providing support in the process of vehicle recovering and sales
	5. Training external network partner to carry services in special critical areas
	6. Consulting of R&D for Magaldi regarding the integration of the 'software' part
2. Diffusion	7. Presenting the service innovation through technical focus meeting all over Brazil
	8. Carried out contact with customers to plan retention and measure satisfaction level
	9. Responsible for contacting customers and insurance companies in problem-solving
	10. Technical real-time monitoring of the stolen vehicle to customers' satisfaction
	11. Manage the mass diffusion process through the web site www.uniconn.com.br
3. Strategy	12. Make the first contact with the police to manage the process of stolen vehicle recovery
	13. Manage business and technical service innovation, except vehicle installation
	14. Manage the service innovation contract with customers and insurance companies
	15. Manage real-time contact with customers to verify veracity of theft: true or false

Neoset has operated for several years in service innovation based on high technologies and for this reason it was chosen to be the hub firm in 'The Network'. The most relevant challenge for the top managers of Neoset was finding new ways to diffuse the innovation based on the network relationship. Continuing to get information from 'The Network', a list of evidences from Magaldi Company is presented in table 8.

Table 8 Magaldi's evidences

Topic	*Empirical evidences*
1. Networks	1. Consulting of R&D for Neoset regarding the integration of the 'hardware' part
	2. Selection, training and certification of external partners for technical installation
	3. Management of the user's innovation network from other security services
2. Diffusion	5. Presenting the service innovation through security focus meeting all over Brazil
	6. Responsible for the early adoption inside 'The Network' and between their partners
3. Strategy	7. Responsible for security consulting with Neoset employees
	8. Management of the innovation service installation on customers' vehicles

From the perspective of user needs, it was important to participate in meetings with customers, which permitted better understanding of the emergent problems of each single customer and single specific reality. The joint creation of small equipment testing developed between Neoset and Magaldi was a key element to connect users to 'The Network'. The device was a miniature vehicle connected to the 'hardware' and to the 'software' in the central office in order to simulate the real process of a vehicle being stolen. In this process, Perto Company interacts only with the recall for maintenance of the service innovation's hardware part. The main role of Perto Company is described in the list of evidences presented in table 9.

Table 9 Perto's evidences

Topic	*Empirical evidences*
1. Networks	1. Responsible for the production of the hardware part in the industrial plant
	2. Responsible for hardware and software updates for customers' recall
2. Diffusion	3. Responsible for the mass diffusion through large insurance companies and banks
	4. Managing the payment of commission, giving awards and sales bonus to partners
3. Strategy	5. Managing the network agreement of Perto, Magaldi and Neoset until august of 2011
	6. Focused in certificating the innovation in the regulatory board (Cesvi Brasil)

In the last twelve months of the empirical research, it was verified that 'The Network' was searching for a better service innovation solution with capacity to produce the 'hardware' in large scale. It was observed that the service diffusion is possible, mainly based on the communications channels of the Perto Company.

Closing the understanding of evidences it was verified that the available network structure and the strong interaction between each key-person in 'The Network' was influencing the innovation results in a positive way. The cooperation through sharing specific dynamic capabilities was very important for the successful process of innovation management.

The constant exchange of information between the patents technical developers of each company was fundamental, because the catalyst hub firm management was performed by Neoset. The service innovation in networks configuration is a way that the competitors use in the development of strategies towards specific market needs.

The costumers perceive the service innovation with large advantage comparing other service solution, good market compatibility and less technology complexity. Using networks structure increases the possibility of spreading an innovation quickly in the market, taking into consideration the values of the social system.

The user-needs are accessed by ‘The Network’ through special routines that were developed for constant exchange of information and then the market tends to absorb the innovation when it comes from different communication channels. It was observed in the Brazilian vehicle security that companies organize processes and strategies differently that in technology markets. This analysis came from the fact that the constant exchange of information between costumers and companies in this market are higher than in standard technology markets.

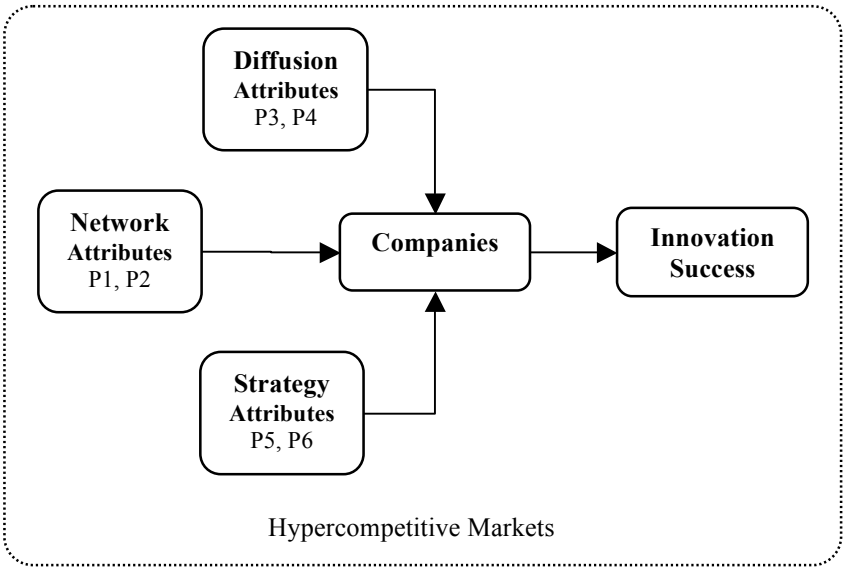
Based on the high speed of changes observed in these hypercompetitive markets, managers designed processes for supporting the update of the service innovation with new information coming from the customers. This provides a continuous feedback within the market to update the innovation based on the real user-needs by combining dynamic capabilities in real-time.

The previous empirical evidences obtained from the in-depth data analysis of ‘The Network’ in Brazilian vehicle security market are used to help on build a model that is presented in the next section.

5 Results

The findings are based on a model that combines six propositions for further research in service innovation management in the context of hypercompetitive markets. The first two propositions were designed aligned with the 'network attributes’, the next two propositions were designed aligned with the 'diffusion attributes’ and the last two were designed aligned with the 'strategy attributes’. The model is presented in figure 1.

Figure 1 The model for service innovation management



Propositions 1 and 2 are suggested for the network based perspective, in which the analysis of service innovation could be done by companies collaborating to overcome constrains, learning from users and managers for better network design and coordination.

Proposition 1 Companies which design the development of service innovation process based on high-technology and are organised through configuration in network, increases the successful rate of the innovation in hypercompetitive markets.

Proposition 2 Companies that manage the development of service innovation using a hub-firm for enabling access to external know-how and for managing the network structure, increases the successful rate of the innovation in hypercompetitive markets.

Propositions 3 and 4 are suggested from a diffusion based perspective, in which the innovation should be perceived for the users and managers as the best and a consistent idea supported by user experimentations and considering the social specific context.

Proposition 3 Companies that develop routines for keeping and improving service innovation diffusion where the technological specifications are designed based on the social system needs, increases the successful rate of the innovation in hypercompetitive markets.

Proposition 4 Companies that design their processes enabling understanding the social systems needs and for organising the early adoption inside the network for reduction of the uncertainty, increases the successful rate of the innovation in hypercompetitive markets.

Propositions 5 and 6 are suggested from a strategy based perspective, in which companies should develop strategies for continuous service innovation, developing their absorptive capacity through resource recombination where hypercompetition in real-time is the challenge.

Proposition 5 Companies that develop routines that enable to combine both the exploitation of dynamic capabilities in top manager level and the exploration of new opportunities, increases the successful rate of the innovation in hypercompetitive markets.

Proposition 6 Companies that develop practices to stimulate the recombination of dynamic capabilities through the ability of the top managers of coordinate, evaluate, learn and act on reconfiguration of strategies to compete in real-time, increases the successful rate of the innovation in hypercompetitive markets.

This set of six propositions aims to present a contribution to the understanding of how companies manage service innovation in hypercompetitive markets. The use of this empirical field on the research focus aims to analyse the new reality of the service innovation that is based on high technology solutions.

The model suggests that to manage service innovation in hypercompetitive markets is necessary different ways that to manage them in standard technological markets. The main reason that confirms this evidence is the hypercompetition in this markets that force companies to move quickly to obtain competitive advantage. The six propositions have the

objective to describe the present challenge of management service innovation in hypercompetitive markets.

6 Discussions and Conclusions

A model for service innovation management in hypercompetitive markets is suggested. It is based on a set of six propositions that could be useful for academic and manager where high velocity environments must be understood and managed. This set of propositions was aimed to support the understanding of the context-specific of high-velocity markets. The Brazilian market understanding and 'The Network' understanding was important for helping on theory building. From this analysis it was possible to verify that innovative organizations are able to develop routines for adapting their process for developing of service innovation based on the velocity of environmental changes in the launch of new services in emerging markets.

The combined research methodology is strongly useful for understanding the phenomena and to present a clear research contribution. More specifically, clinical inquiry research could be the most appropriate methodology to fit theory building in conditions of hypercompetitive markets. This methodology also enable managers to find the main companies' problems and propose the appropriate solution in real-time for the specific needs both for the companies and customers. The qualitative approach was fundamental considering the lack of literature regarding service innovation in hypercompetitive markets. Several studies analyse service innovation and the new service development in technology markets, and for this reason the analysis of the literature applied for hypercompetitive markets could be considered as nascent theory. This nascent theory could be better analysed through the using of qualitative methods rather than quantitative, mainly because the service innovation in hypercompetitive markets could be considered as a new phenomenon that aims to deeper understanding.

The main limitations are related to the hard process of obtaining data for the reasons of high level of information security and privacy laws of the market of service security in Brazil. Another limitation is that the in-depth analysis was carried out only with 'The Network' that represents one of the main eight competitors in the market. For this reasons the secondary data analysis carried out with the others seven competitors could be not enough to permit the understanding of the hypercompetition phenomenon. Another important limitation is the lack of collection of quantitative data to test in the market the

model with the six propositions.

The main implications of this research suggest that the academy will gain with a set of propositions aiming to improve the literature of service innovation management, that are related to organizing networks for technology diffusion in environments where the design of flexibility process are imperative. The managers will gain with the presentation of the reach and relevance of the study about how to organize processes for enabling network robustness and overcome constrains, taking into consideration the companies' attempts to improve competitive advantage under conditions of hypercompetition. The managers also should recognize and measure the turbulence provided by this kind of markets, it means that this action will help managers to better organize resources and manage risks in order to improve competitive advantage. The society will gain indirectly with a way for user involvement in the development of innovative services to solve emerging real problems, by addressing the social and economic needs.

The future research priorities could be addressed on the management of the development processes that enable service innovation in hypercompetitive markets. In this sense the avenue for further research could be based on the five main routes: i. The identification of the main drivers that enable the integration of costumers in the processes to the new service development. ii. The analysis of processes that enable radical design thinking for service innovation in hypercompetitive markets. iii. The exploration of the drivers that enable decision-making effectiveness for service diffusion based on high-technologies. iv. The identification of which are the main variables that express the turbulence of hypercompetitive markets. v. The identification of which are the main variables that express superior performance of companies for competitive advantage in hypercompetitive markets.

Acknowledgements

I would like to thank Professor Roberto Verganti from Politecnico di Milano, Professor A.B. (Rami) Shani from California Polytechnic State University and Politecnico di Milano and Professor Harry Boer from Aalborg University for helpful comments and suggestions, as well as from two IJTMkt anonymous reviewers. I appreciate feedback received from participants of the 7th CINet PhD Seminar in Milan, Italy and XXII ISPIM Conference in Hamburg, Germany, in the earlier versions of this paper. I am grateful for the financial support of Politecnico di Milano.

References

Ambrosini, V., and Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, v.11, issue 1, pp. 29-49.

Anderson, P. (1999). Complexity theory and organization science. *Organization Science,* Vol. 10, No.3, pp. 216-232.

Arnold, D. J., and Quelch, J. A. (1998). New strategies in emerging economies. *Sloan Management Review,* 40(1): 7-20.

Attewell, P. (1992). Technology diffusion and organizational learning: The case of business computing. *Organization Science,* Vol.3, No.1, pp. 1-19.

Barney, J. B. (2001). Is the resource-based "view" a useful perspective for strategic management research? Yes. *Academy of Management Review,* Vol. 26, No. 1, 41-56.

Battisti, S. (2009). The future of innovation is services based on high technologies. In: Von Stamm, B.; Trifilova, A. *The Future of Innovation.* 1st Edition. Surrey, England-UK. Gower Publishing Limited, pp. 382-383.

Battisti, S., Thomas, E. and Bignetti, L. P. (2008). R&D as a social process: the case of the development of a new device for vehicle localization in Brazil. *IAMOT Conference Proceeding.* International Association for Management of Technology, Dubai-UAE.

Bessant, J., Lamming, R., Noke, H. and Phillips, W. (2005). Managing innovation beyond the steady state. *Technovation.* (25), 1366-1376.

Bilgram, V., Brem, A. and Voigt, K. (2008). User-Centric innovations in new product development-systematic identification of lead users harnessing interactive and collaborative online-tools. *International Journal of Innovation Management,* Vol. 12, Issue:3, pp. 419-458.

Boer, H., and Gertsen, F. (2003). From continuous improvement to continuous innovation: a (retro)(per)spective. *Int. J. Technology Management,* Vol. 26, No. 8, pp.805-827.

Bogner, W. C., and Barr, P. S. (2000). Making sense in hypercompetitive environments: A cognitive explanation for the persistence of high velocity competition. *Organization Science,* Vol. 11, No. 2, 212-226.

Brass, D. J., Galaskiewicz, J., Greve, H. R. and Tsai, W. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal,* Vol. 47, No. 6, 795-817.

Brown, S. L., and Eisenhardt, K. M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly,* 42, 1-34.

Buganza,T., Dell'Era, C. and Verganti, R. (2009). Exploring the relationships between product development and environmental turbulence: The case of mobile TLC Services. *Journal of Product Innovation Management,* 26:308–321.

Calantone, R., Garcia, R., and Droge, C. (2003). The Effects of Environmental Turbulence on New Product Development Strategy Planning. *Journal of Product Innovation Management,* 20:90–103.

Chanda, U. and Bardhan, A.K. (2008). A study of the diffusion parameters and marketing decision variables for a family of technological innovations. *Int. J. Technology Marketing, Vol*.3, No.4, pp.358-375.

Chiaroni, D., Chiesa, V., De Massis, A. and Frattini, F. (2008). The knowledge bridging role of Technical and Scientific Services in knowledge-intensive industries. *Int. J. Technology Management,* Vol. 41, Nos. 3/4, pp.249–272.

Chiesa, V. and Frattini, F. (2011). Commercializing technological innovation: learning from failures in high-tech markets. *Journal of Product Innovation Management,* 28:437–454.

Chiesa, V., Manzini, R. and Pizzurno, E. (2004). The externalisation of R&D activities and the growing market of product development services. R&D Management, 34: 65-75.

Coghlan, D. (2009). Toward a philosophy of clinical inquiry/research. *Journal of Applied Behavioral Science,* 45 (1), 106-121

Cohen, W.M. and Levinthal, D.A. (1990). Absorptive capacity: a new perspective on learning and innovation, *Administrative Science Quarterly,* Vol. 35, No. 1, p.128-152.

Chakravorti, B. (2004). The new rules for bringing innovations to market. *Harvard Business Review,* 82 (3), 58-67.

Christensen, C.M.; Suárez, F.F. and Utterback, J.M. (1998). Strategies for survival in fast-changing industries. *Management Science,* Vol. 44, No. 12. pp. 207-220.

D'Aveni, R. A. (1994). *Hypercompetition: Managing the dynamics of strategic maneuvering.* New York: The Free Press.

Dhanaraj, C., and Parkhe, A. (2006). Orchestrating innovation networks. *Academy of Management Review,* Vol. 31, No. 3, 659-669.

Dodgson, M., Gann D. and Salter A. (2008). *The management of technological innovation: strategy and practice.* 2nd Edition. Oxford University Press.

Dodgson, M., Gann, D.M. and Salter A.J. (2002). The intensification of innovation. *International Journal of Innovation Management,* Vol.6, Issue:1, pp.53-83.

Dolfsma, W. (2004). The process of new service development-Issues of formalization and appropriability. *International Journal of Innovation Management,* Vol.8, Issue:3, pp.319-337.

Edmonson, A.C., and McManus, S.E. (2007) Methodological fit in management field research, *Academy of Management Review,* Vol. 32, No. 4, pp. 1155–1179.

Eisenhardt, K.M. (1989a). Building theories from case study research. *Academy of Management Review,* vol. 14, No. 4, 532-550.

Eisenhardt, K.M. (1989b). Making fast strategic decisions in high-velocity environments. *Academy of Management Journal,* vol. 32, No. 3, 543-576.

Eisenhardt, K.M., and Graebner, M. E. (2007). Theory building from cases: opportunities and challenges. *Academy of Management Journal,* vol. 50, No. 1, 25-32.

Eisenhardt, K.M., and Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal,* vol. 21, 1105-1121.

Ethiraj, S. K., Kale, P., Krishnan, M. S. and Singh, J. V. (2005). Where capabilities come from and how do they matter? A study in the software services industry. *Strategic Management Journal,* 26: 25-45.

Ettlie, J. E., and Rosenthal, S.R. (2011). Services versus manufacturing innovation. *Journal of Product Innovation Management,* 28: 285-299.

Flyvbjerg, B. (2006). Five misunderstanding about case-study research. *Qualitative Inquiry,* Vol. 12, No 2, pp 219-245.

Geroski, P.A. (2000). Models of technology diffusion. *Research Policy,* Vol. 29, Issues 4-5, pp. 603-625.

Gibbons, D. E. (2004). Network structure and innovation ambiguity effects on diffusion in dynamic organizational. *Academy of Management Journal,* Vol. 47, No. 6, 938-951.

Goduscheit, R.C. (2009). Leadership in interorganisational network-based innovation projects, *Int. J. Technology Marketing,* Vol. 4, Nos. 2/3, pp.149–164.

Greve, H. R. (2009). Bigger and safer: The diffusion of competitive advantage. *Strategic Management Journal,* 30: 1-23.

Gulati, R. (1999). Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, 20 (5), pp. 397-420.

Gulati, R., Lavie, D. and Singh, H. (2009). The nature of partnering experience and the

gains from alliances. *Strategic Management Journal,* vol. 30, 1213-1233.

Gulati, R., Nohria, N. and Zaheer, A. (2000). Strategic Networks. *Strategic Management Journal,* vol. 21, 203-215.

Hermelo, F. D., and Vassolo, R. (2010). Institutional development and hypercompetition in emerging economies. *Strategic Management Journal,* vol. 31, 1457-1473.

Hoskisson, R. E., Eden, L., Lau, C. M. and Wright, M. (2000). Strategy in emerging economies. *Academy of Management Journal,* Vol. 43, No. 3, 249-267.

Ilinitch, A.Y., D'Aveni, R.A. and Lewin, A.Y. (1996). New organizational forms and strategies for managing in hypercompetitive environments. *Organization Science,* Vol. 7, No. 3, 211-220.

Karttinen, A., Jarvensivu, T. and Tuominen, M. (2008). Managing gerontechnological innovation in networks. *Int. J. Technology Marketing,* Vol.3, No.4, pp.392-402.

Lavie, D. (2007). Alliance portfolios and firm performance: A study of value creation and appropriation in the U.S. software industry. *Strategic Management Journal,* vol. 28, 1187-1212.

MacCormack, A. and Verganti, R. (2003). Managing the sources of uncertainty: Matching process and context in software development. *Journal of Product Innovation Management,* 20: 217–232.

Miles, I. (2000). Services innovation: Coming of age in the knowledge-based economy. *International Journal of Innovation Management,* Vol.4, Issue:4, pp.371-389.

Norton, J.A. and Bass, F.M. (1987). A diffusion theory model of adoption and substitution for successive generations of high-technology products. *Management Science,* Vol. 33, No.9, pp. 1069-1086.

Pisano, G. and Verganti, R. (2008). Which kind of collaboration is right for you? *Harvard Business Review*, 25/4: pp. 78-87.

Ratten, V. (2009). Adoption of technological innovations in the m-commerce industry. *Int. J. Technology Marketing,* Vol.4, No.4, pp.355-367.

Rogers, E. M. (2003). *Diffusion of innovations.* 5th Edition. New York: Free Press.

Rothwell, R. (1992) Successful industrial innovation: Critical factors for the 1990s. *R&D Management,* 22(3), 221–239.

Schein, E. H. (2008). *Clinical inquiry/research*. In P. Reason & H. Bradbury (Eds.), Handbook of action research. 2nd ed. London: Sage. pp. 266-279.

Schleimer, S. C., and Shulman, A. D. (2011). A comparison of new services versus new product development: Configurations of collaborative intensity as predictors of

performance. *Journal of Product Innovation Management,* 1-15.

Shani, A.B. (Rami), David, A. and Wilson, C. (2004). *Collaborative Research: Alternative Roadmaps*. In: Ader, N., Shani, A.B. (Rami), Styhre, A., (Eds.) Collaborative Research in Organizations: Foundations for Learning, Change and Theoretical Development, Thousand Oaks, CA: SAGE, pp. 83-100.

Smart, P., Bessant, J. and Gupta, A. (2007). Towards technological rules for designing innovation networks: a dynamic capabilities view. *International Journal of Operations and Production Management.* v. 27 (10), pp. 1069-1092.

Smith, W., and Tushman, M. L. (2005). Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science,*16: 522-536.

Stebbins, M., and Shani, A.B. (Rami). (2009). Clinical inquiry and reflective design in a secrecy based organization. *Journal of Applied Behavioral Science,* 45 (1) 59-89

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*. John Wiley & Sons, Ltd.

Teece, D.J., Pisano, G. and Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal,* v. 18, n.7, pp. 509-533.

Tidd, J. (2010). From models to the management of diffusion. In: Tidd, J. *Gaining momentum: Managing the diffusion of innovations.* Series on technology management. 1st Edition. World Scientific Pub Co.

Tidd, J., and Hull, F. (2003). *Service innovation: Organizational responses to technological opportunities and market imperatives.* London: Imperial College Press.

Tidd, J., Bessant, J. and Pavitt, K. (2005). *Managing innovation: integrating technological, market and organisational change,* 3rd Edition. Chichester: Wiley.

Tushman, M., Smith, W.K, Wood, R.C., Westerman, G and O'Reilly, C. (2010). Organizational designs and innovation streams. *Industrial and Corporate Change,* Vol. 19, No. 5, pp. 1331–1366.

van Riel, A. C. R., Lemmink, J. and Ouwersloot, H. (2004). High-technology service innovation success: A decision-making perspective. *Journal of Product Innovation Management,* 21: 348-359.

Verganti, R. (2008). Design, meanings, and radical innovation: A metamodel and a research Agenda. *Journal of Product Innovation Management,* 25: 436-456.

Verganti, R. (2011). Radical design and technology epiphanies: A new focus for research

on design management. *Journal of Product Innovation Management,* 28:384-388.

Verganti, R. and Buganza, T. (2005). Design inertia: Designing for life-cycle flexibility in internet-based services. *Journal of Product Innovation Management,* 22:223–237.

Volberda, H.W. (1996). Toward the flexible form: How to remain vital in hypercompetitive environments. *Organization Science,* Vol. 7, No. 4, pp.359-374.

von Hippel, E. (2007). Horizontal innovation networks – by and for users. *Industrial and Corporate Change.* Vol. 16, n.2, pp. 293-315.

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal,* v. 24, 991-995.

Yin, R.K. (2009). *Case study research: design and methods.* 4th Edition. Applied Social Research Methods. Vol.5. Thousand Oaks, CA: Sage Publications.

Zaheer, A., and Bell, G. G., (2005). Benefiting from network position: firm capabilities, structural holes, and performance. *Strategic Management Journal,* v. 26, 809-825.

Zahra, S. A., and George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Journal,* Vol. 27, No. 2, 185-203.

Zahra, S. A., and Nielsen, A. P. (2002). Sources of capabilities, integration and technology commercialization. *Strategic Management Journal,* v. 23, 377-398.

Zhang, D.D. (2009). Absorptive capability and its mediating effect on the learning and market orientations' influences on performance, *Int. J. Technology Marketing,* Vol. 4, Nos. 2/3, pp.275–288.

Zollo, M., and Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science,* 13: 339-351.